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NOTICE OF ALLOWANCE AND FEE(S) DUE

22879

7590

08/28/2008

HEWLETT PACKARD COMPANY
P O BOX 272400, 3404 E. HARMONY ROAD
INTELLECTUAL PROPERTY ADMINISTRATION
FORT COLLINS, CO 80527-2400

EXAMINER

PATEL, NIKETA I

ART UNIT

PAPER NUMBER

2181

DATE MAILED: 08/28/2008

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/631,160	07/31/2003	James R. Peterson	200207081-1	7545

TITLE OF INVENTION: SYSTEM AND METHOD FOR ADAPTIVE BUFFER ALLOCATION IN A MEMORY DEVICE INTERFACE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1440	\$300	\$0	\$1740	11/28/2008

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** **Mail Stop ISSUE FEE**
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P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax **(571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

22879 7590 08/28/2008

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nonprovisional	NO	\$1440	\$300	\$0	\$1740	11/28/2008

EXAMINER	ART UNIT	CLASS-SUBCLASS
PATEL, NIKETA I	2181	710-052000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a **Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
- (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
- 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 525 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 525 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability

Application No.

10/631,160

Examiner

NIKETA I. PATEL

Applicant(s)

PETERSON ET AL.

Art Unit

2181

- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to After Final filed on 7/21/2008.
2. ☒ The allowed claim(s) is/are 1,3-6,8-11,13-17 and 19.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
(a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
(b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/Niketa I. Patel/
Primary Examiner, Art Unit 2181

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Randy R. Schoen (Reg. No. 62,440) on 8/18/2008.

The application has been amended as follows:

Claim 1. (Previously Presented) A method comprising:

determining at least one characteristic of a first input/output (I/O) device that is coupled to a memory device interface, the memory device interface being configured to enable data transfers between the first I/O device and a memory device;

providing buffer allocation information to the first I/O device responsive to the at least one characteristic of the first I/O device;

buffering data corresponding to the first I/O device in a first portion of a buffer of the memory device interface, a size of the first portion corresponding to the buffer allocation information provided to the first I/O device;

determining at least one characteristic of a second I/O device that is coupled to the memory device interface;

providing buffer allocation information to the second I/O device responsive to the at least one characteristic of the second I/O device; and

buffering data corresponding to the second I/O device in a second portion of the buffer, a size of the second portion corresponding to the buffer allocation information provided to the second I/O device.

Claim 2. (Canceled).

Claim 3. (Previously Presented) The method of claim 1, further comprising:

receiving data from the first I/O device via a first data transfer link; and

receiving data from the second I/O device via a second data transfer link.

Claim 4. (Previously Presented) The method of claim 1, further comprising:

- receiving a first data unit from the first I/O device;
- buffering the first data unit in the first portion of the buffer;
- transferring the first data unit to the memory device;
- receiving a second data unit from the second I/O device;
- buffering the second data unit in the second portion of the buffer; and
- transferring the second data unit to the memory device.

Claim 5. (Original) The method of claim 1, wherein the at least one characteristic comprises at least one of:

- a rate at which the I/O device is able to read data from the memory device;
- a rate at which the I/O device is able to write data to the memory device;
- a bandwidth of a link coupled between the I/O device and the memory device interface;
- a size of a data unit that the I/O device reads from the memory device per read request;
- a size of a data unit that the I/O device writes to the memory device per write request;
- a tolerance that the I/O device has for a delay by the memory device interface in fulfilling a write request; or
- a tolerance that the I/O device has for a delay by the memory device interface in fulfilling a read request.

Claim 6. (Currently Amended) A method for allocating buffer capacity in a memory device interface that is configured to transfer data between an input/output (I/O) device and a memory device, the method comprising:

providing allocated buffering capacity to a first I/O device that provides data to the memory device interface via a first data transfer link;

buffering data received via ~~[[a]]~~ the first data transfer link in a first portion of a buffer of the memory device interface;

providing allocated buffering capacity to a second I/O device that provides data to the memory device interface via a second data transfer link;

buffering data received via ~~[[a]]~~ the second data transfer link in a second portion of the buffer, ~~[[a]]~~ the allocated buffering capacity of the first portion being different than ~~[[a]]~~ the allocated buffering capacity of the second portion; and

wherein the allocated buffering capacity of the first portion is responsive to at least one characteristic of ~~[[a]]~~ the first I/O device ~~that provides data to the memory device interface via the first data transfer link,~~ and the allocated buffering capacity of the second portion is responsive to at least one characteristic of ~~[[a]]~~ the second I/O device ~~that provides data to the memory device interface via the second data transfer link.~~

Claim 7. (Canceled)

Claim 8. (Previously Presented) The method of claim 6, further comprising:

- receiving a first data unit from the first I/O device via the first data transfer link;
- buffering the first data unit in the first portion of the buffer;
- transferring the first data unit to the memory device;
- receiving a second data unit from the second I/O device via the second data transfer link;
- buffering the second data unit in the second portion of the buffer; and
- transferring the second data unit to the memory device.

Claim 9. (Previously Presented) The method of claim 6, further comprising:

- receiving a first data unit from the memory device;
- buffering the first data unit in the first portion of the buffer;
- transferring the first data unit to the first I/O device;
- receiving a second data unit from the memory device;
- buffering the second data unit in the second portion of the buffer; and
- transferring the second data unit to the second I/O device.

Claim 10. (Currently Amended) A memory device interface that is configured to enable data transfers between an input/output (I/O) device, the memory device interface comprising:

a buffer;

a first plurality of registers that are configured to enable the memory device interface to buffer in a first portion of the buffer data corresponding to a first I/O device; and

a first buffer allocation counter that specifies a buffer allocation value that is configured to enable data received from the first I/O device to be buffered in the first portion of the buffer;

a second plurality of registers that are configured to enable the memory device interface to buffer in a second portion of the buffer data corresponding to a second I/O device, a size of the first portion of the buffer being different than a size of the second portion of the buffer; and

a second buffer allocation counter that specifies a buffer allocation value that is configured to enable data received from the second I/O device to be buffered in the second portion of the buffer.

Claim 11. (Original) The memory device interface of claim 10, wherein the buffer comprises random access memory (RAM).

Claim 12. (Canceled)

Claim 13. (Currently Amended) The memory device interface of claim 11 [[12]], wherein the value of the first buffer allocation counter is decremented responsive to a buffer allocation value being sent to the first I/O device.

Claim 14. (Original) The memory device interface of claim 13, wherein the value of the first buffer allocation counter is incremented responsive to data being read from the first portion of the buffer.

Claim 15. (Currently Amended) A memory device interface comprising:

a buffer;

a first plurality of registers that are configured to enable the memory device interface to buffer in a first portion of the buffer data received via a first data transfer link; and

a first buffer allocation counter that specifies a buffer allocation value that is configured to enable data received via the first data transfer link to be buffered in the first portion of the buffer;

a second plurality of registers that are configured to enable the memory device interface to buffer in a second portion of the buffer data received via a second data transfer link, a size of the first portion of the buffer being different than a size of the second portion of the buffer; and

a second buffer allocation counter that specifies a buffer allocation value that is configured to enable data received via the second data transfer link to be buffered in the second portion of the buffer.

Claim 16. (Original) The memory device interface of claim 15, wherein the buffer comprises random access memory (RAM).

Claim 17. (Original) The memory device interface of claim 15, wherein the first data transfer link is coupled to a first input/output (I/O) device, and the second data transfer link is coupled to a second I/O device.

Claim 18. (Canceled)

Claim 19. (Previously Presented) A system comprising:

means for determining at least one characteristic of a first input/output (I/O) device and at least one characteristic of a second I/O device, the first and second I/O devices coupled to a memory device interface, the memory device interface being configured to enable data transfers between the I/O devices and a memory device;

means for providing buffer allocation information to the first I/O device responsive to the at least one characteristic of the first I/O device and to the second I/O device responsive to the at least one characteristic of the second I/O device;

means for buffering data corresponding to the first I/O device in a first portion of a buffer of the memory device interface, a size of the first portion corresponding to the buffer allocation information provided to the first I/O device; and

means for buffering data corresponding to the second I/O device in a second portion of the buffer, a size of the second portion corresponding to the second buffer allocation information provided to the second I/O device.

Claim 20. (Canceled).

2. The following is an examiner's statement of reasons for allowance: please, refer to applicant's arguments filed on 7/21/2008, pages 11-20.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NIKETA I. PATEL whose telephone number is (571)272-4156. The examiner can normally be reached on M-F 8:00 A.M. to 6:00 P.M, with every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alford Kindred can be reached on (571) 272 4037. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Niketa I. Patel/
Primary Examiner, Art Unit 2181